

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Solar Cell Module) Atty Dkt. TOR.011.0001.NP
)
 Inventor: Sadaji Tsuge) Confirmation No.: 1063
)
 Serial No.: 09/788,339) Examiner: Barton, Jeffrey Thomas
)
 Filing or 371(c) Date: 2/21/01) Art Unit: 1753

Honorable Commissioner for Patents
Alexandria, Virginia 22313-1450

AMENDMENT AFTER FINAL UNDER 37 C.F.R. 1.116

In response to the final Office action dated January 15, 2008, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 4 of this paper.

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. – 15. (Cancelled)

16. (Currently amended) A solar cell module comprising:
a solar cell element;
an incident light transmitting member made of a glass adhered at a light incidence side of the solar cell element by a resin; and
a rear surface member comprising a transparent resin film adhered at a rear surface side of the solar cell element by a resin, wherein
the solar cell element comprises a semiconductor junction so as to form an electric field and is sealed with each of the resin adhering the light incidence side light transmitting member and the rear surface member,
the resin for adhering the incident light transmitting member at the light incidence side of the solar cell element contains a sodium ion depositing from the incident light transmitting member, and
the solar cell element comprises a one conductive type crystalline semiconductor substrate between the semiconductor junction and the resin containing the sodium ion so as to shield a diffusion of sodium ion to the semiconductor junction; and
an anti-reflection layer between the one conductive type semiconductor substrate [[layer]] and the resin containing the sodium ion, said anti-reflection layer comprising a silicon dioxide layer.

17. (Cancelled)

18. (Currently amended) The solar cell module according to claim 16, wherein

the semiconductor junction structure includes a single crystalline silicon substrate [[layer]] having a thickness so as to shield the diffusion of sodium ions from said resin into said semiconductor junction.

19. (Previously presented) The solar cell module according to claim 16, further comprising: a one conductive type semiconductor substrate [[layer]] between the one conductive type crystalline semiconductor substrate and the resin containing the sodium ion.

20. (Previously presented) The solar cell module according to claim 19, further comprising:

 a transparent electrode between the one conductive type semiconductor substrate [[layer]] and the resin containing the sodium ion.

21. (Cancelled)

22. (Currently amended) The solar cell module according to claim 16, wherein the semiconductor junction is formed by a first conductive type crystalline semiconductor substrate and a second conductive type crystalline semiconductor substrate [[layer]].

23. (Currently amended) The solar cell module according to claim 16, wherein the semiconductor junction is formed by a first conductive type crystalline semiconductor substrate and a second conductive type amorphous semiconductor substrate [[layer]].

24. (Currently amended) The solar cell module according to claim 23, comprising: an intrinsic amorphous semiconductor between the first conductive type crystalline semiconductor substrate and the second conductive type amorphous semiconductor substrate [[layer]].

25 - 27. (Cancelled)

Remarks

Claims 16, 18 – 20 and 22 - 24 remain pending in this application. Further consideration is requested.

35 U.S.C. § 112 Second Paragraph Rejection

Claims 16, 18-20 and 22-24 have been amended to revise the term “semiconductor layer” to –semiconductor substrate—to eliminate the indefiniteness rejection of these claims. Accordingly, entry of this amendment and withdrawal of this ground of rejection are requested.

35 U.S.C. § 103 Rejections

The rejection of claims 16, 18-20, 23 and 24 as being unpatentable over JP 11-307791 in view of Yamagishi et al., Brandhorst, Jr., Spitzer, Mitsui, and the instant disclosure, of claims 16, 18-20 and 22 as being unpatentable over Brandhorst, Jr. in view of Mimura et al., Mitsui and the instant disclosure, of claims 16, 18-20 and 22 as being unpatentable over Mimura in view of Brandhorst, Jr., Mitsui and the instant disclosure, are respectfully traversed.

In particular, the present invention provides a solar cell module with increased light efficiency and high power generation without degradation. In accordance with the invention, a transparent rear surface member is used to increase the amount of light entering the solar cell for production of electric power. In the prior art, such transparent member resulted in increased permeation of water into the module, with resulting degradation of power generation. The present inventors discovered that this undesired degradation is related to diffusion of sodium ions from the front glass surface into the resin when water enters into the module, and subsequent degradation of the semiconductor junction caused by the increased sodium ion concentration. Accordingly, the present invention solves this discovered problem by forming the semiconductor junction at a location away from or opposite to the incident light transmitting or glass surface.

As shown in Figs. 1 and 2, the p-n junction (between layers 31 and 32, Fig. 1, and between layers 51 and 53, Fig. 2) is formed opposite from the glass surface 1 as opposed to the prior art solar cell module as shown in Fig. 4. Hence, claim 16 has been amended to more explicitly set forth this structure, wherein a specific material in the resin layer containing the sodium and material used for the antireflective coating.

None of the prior art references relied upon in the multiple grounds of rejection, and no combination thereof, discloses such structure. JP '791 arranges the pn junction interface on the light incidence side, in complete accordance with the common sense technical knowledge at the time of the JP '791 disclosure. Thus, the position of the Office action that it would have been obvious to reverse or invert the structural composition of the JP '791 device is contrary to the common sense of those skilled in the art at the time and thus would not have been obvious, but instead is a clear hindsight attempt to reconstruct the claimed invention.

Brandhorst, Jr. teaches a cell wherein light enters from the side of substrate 10, and p+ layer disposed on a p-type substrate. However, even if Brandhorst, Jr. and Mitsui were to be combined with JP '791, the result would not disclose the limitation of shielding a diffusion of sodium ions to the pn junction as claimed in the present application. Further, the Office action's use of the disclosure of the present application at page 5, line 19 – page 7, line 2 as prior art is improper. The relied-on passage of the application is an explanation of one of the premises of the invention, and is not a discussion of prior art or related art, and does not constitute an admission of prior art as alleged. Thus, the grounds of rejection are untenable to the extent that they improperly use the inventor's own teachings against him.

Conclusion

In view of the foregoing, claims 16 and 18-20 and 22-24 are submitted to define patentable subject matter over the prior art of record, whether considered individually or in combination. Further and favorable reconsideration of this application, withdrawal of the outstanding grounds of rejection, and the issuance of a Notice of Allowance are earnestly solicited.

Respectfully submitted,



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